

Figure 16 illustrates a synthesizer 1, a robotic means 92, a cleave and deprotect component 93 and a purification component 94.

Figures 17A-C illustrate different embodiments of energy input components 95 and mixing components 96.

5        Figures 18A-B illustrate different combinations of energy input components 95 and mixing components 96.

Figure 19A illustrates a synthesizer having a ventilation opening in a lid enclosure

Figures 19B and 19C illustrate a synthesizer having ventilation tubing attached to a ventilation opening in a lid enclosure.

10        ~~Figures 20A and 20B~~ <sup>Figures 20A - 20C</sup> illustrate synthesizers having ventilated workspaces.

Figures 21A and 21B provide cross sectional views of an exemplary synthesizer having a lid enclosure 102, and illustrate air flow 109 toward the ventilation tubing 103 when the lid enclosure 102 is in a closed or opened position, respectively.

15        Figures 22A and 22B provide cross sectional views of an exemplary synthesizer having a primarily enclosed space in a base 2, and illustrate air flow 109 toward the ventilation tubing 103 when the lid enclosure 102 is in a closed or opened position, respectively.

## 20        GENERAL DESCRIPTION OF THE INVENTION

25        The present invention relates to nucleic acid synthesizers and methods of using and modifying nucleic acid synthesizers. For example, the present invention provides highly efficient, reliable, and safe synthesizers that find use, for example, in high throughput and automated nucleic acid synthesis (*e.g.* arrays of synthesizers), as well as methods of modifying pre-existing synthesizers to improve efficiency, reliability, and safety.

30        A problem with currently available synthesizers is the emission of undesirable gaseous or liquid materials that pose health, environmental, and explosive hazards. Such emissions result from both the normal operation of the instrument and from instrument failures. Emissions that result from instrument failures cause a reduction or loss of synthesis efficiency and can provoke further failures and/or complete synthesizer failure. Correction of failures may require taking the synthesizer off-line for cleaning and repair.

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07.24.08